Space Weather Forecast

Issued on Friday, 08 March 2024 at 12:40 Local

This forecast provides a four-day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

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Space Weather Forecast Headline: Chance of G1/Minor Geomagnetic Storm in next 24 hours. Now reduced daily slight chance of Moderate-class X-ray flares.

Analysis of Space Weather Activity over past 24 hours

Solar Activity: Solar activity showed occasional low-level Common-class X-ray flares that became fewer and further between as the period progressed. The peak flare of the period was a mid-ranking Common-class at 07/1207UTC from a complex sunspot near the middle of the Sun. This is one of up to six on the facing side at present, but is the only group showing any real complexity. Its trend in recent hours has been of decreasing overall area, which is sometimes reflective of a reducing flare threat.

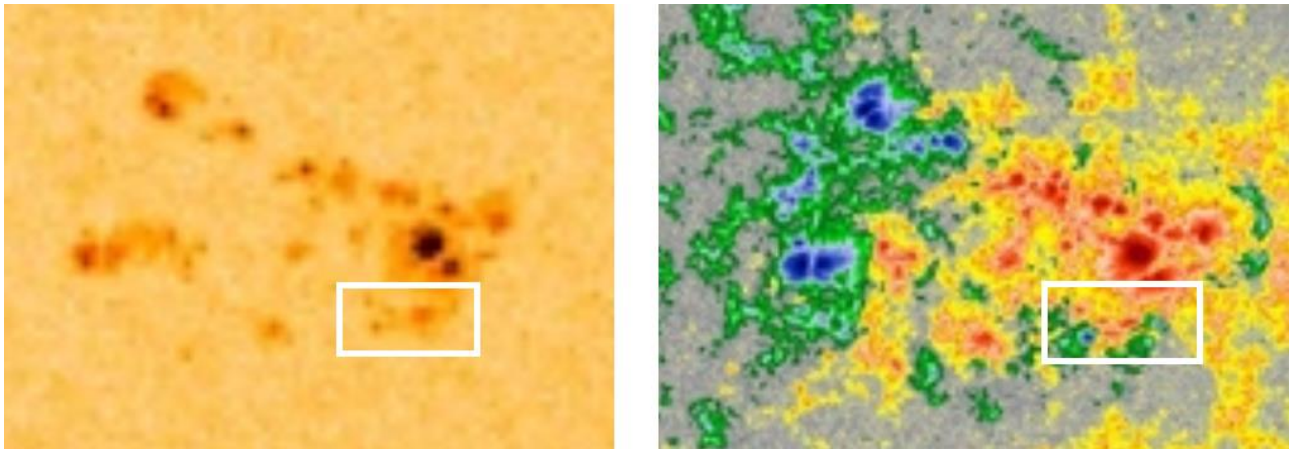

Figure 1: Visible and magnetic imagery of a sunspot group near the middle of the Sun. The overall areal coverage of this sunspot has reduced in recent hours, however the white boxed region contains a potentially unstable configuration of opposing magnetic fields in close proximity, and its continued behaviour cannot be relied upon.

One of the more noteworthy events in the period was a small emission from the vicinity of a sunspot near the middle of the Sun around 07/1300UTC (seen in extreme UV light). This was followed by an areally-extensive 'coronal dimming', although the rate at which this occurred was slow. There was little resulting on imagery, however a few assessments as to possible Coronal Mass Ejections (CMEs) have been made, with the result(s) being a possible weak glancing blow in the UTC morning of 11 March, with a most likely Earth-orbital radius crossing time of 11/0600UTC.

Other events in the period included CMEs from immediately over the northwestern solar horizon, with neither bearing any Earth-directed component. In addition, no solar radiation storms resulted. A potential filament eruption was noted late in the current 24-hour period leaving the northeast around 08/1100UTC. Satellite imagery for this final potential event is awaited.

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Solar Wind / Geomagnetic Activity: Solar wind parameters suggested Earth has now entered a fast solar wind environment. The solar wind speed rose successively in the period: starting near background, it underwent a minor enhancement after 1830UTC, and again at 08/0320UTC to an eventual peak at elevated levels. The number of particles in the solar wind generally fell away with each new enhancement, although it remained within its typical background range throughout. The associated magnetic field peaked at slightly elevated levels prior to the 1830UTC changes, while the north-south component was changeable.

The net result of the above solar wind measures was for provisionally quiet geomagnetic activity, peaking well below Minor Storm G1 throughout.

Energetic Particles / Solar Radiation: No solar radiation storms were observed.

Four-Day Space Weather Forecast Summary

Solar Activity: Expected to remain generally low with a slight chance of an isolated Moderate-class flare, mainly from the complex central sunspot. No significant regions leave or arrive in the period, meaning the trend is flat.

Solar Wind / Geomagnetic Activity: A CME that left the Sun on 05 March may give a glancing blow later in the current UTC day (Friday 08 March) or into early Saturday. A second CME mentioned above may now also give glancing influence early on Monday 11 March, although this event is of lower confidence.

Earth is otherwise now showing fast wind influence, with elevated solar winds now in course. These should ease later in the coming UTC weekend and into the new working week.

All considered, geomagnetic activity carries a chance of rising to Minor Storm G1 should the 05 March CME arrive earlier in the next 24 hours, else the risk lessening due to the slower speeds involved and the smaller overlap with the current fast wind. A second CME then perhaps rounds out the four days with a slight chance of G1 on Monday 11 March.

Energetic Particles / Solar Radiation: No solar radiation storms are expected.

Geomagnetic Storms:

Geo-Magnetic Storm Probability (Exceedance)	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Minor or Moderate	G1 to G2	No	25	20	1	10
Strong	G3	No	1	1	1	1
Severe	G4	No	1	1	1	1
Extreme	G5	No	1	1	1	1

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Radio Blackouts - X Ray Flares:

X Ray Flares	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC)	Day 2 (00-24 UTC)	Day 3 (00-24 UTC)	Day 4 (00-24 UTC)
Probability			(%)	(%)	(%)	(%)
Active	R1-R2 M Class	No	20	20	20	20
Very Active	R3 to R5 X	No	1	1	1	1

Solar Radiation Storms - (High Energy Protons):

Radiation Storms	Level (cm^{-2} sr^{-1} s^{-1})	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC)	Day 2 (00-24 UTC)	Day 3 (00-24 UTC)	Day 4 (00-24 UTC)
Probability (Exceedance)			(%)	(%)	(%)	(%)
Active	≥ S1	No	5	5	5	5
Very Active	≥ S3 *	No	1	1	1	1
* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)						

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